REMARKS

Claims 9-11 and 17 are presently pending in the application. Claims 1-4 have been withdrawn from consideration as being drawn to a non-elected invention, Claims 12-16 canceled, and Claim 17 added. Reconsideration and allowance of all claims are respectfully requested in view of the following remarks.

In view of the Examiner's approval of the Proposed Drawing Corrections submitted December 11, 2001, the Applicants hereby submit corrected Formal Drawings and request that the Examiner acknowledge receipt of the two (2) sheets of Formal Drawings.

The Examiner has finally rejected Claim 9 under 35 U.S.C. 103(a) as being unpatentable over Holland (USPN 4,311,725) in view of Rahn (USPN 5,483,378). The Examiner has also finally rejected Claims 10-16 under 35 U.S.C. 103(a) as being unpatentable over de Vrieze et al. (USPN 5,068,568) in view of Holland (USPN 4,311,725) and in further view of Rahn (USPN 5,483,378) and Nulman (USPN 5,754,297). Claims 12-16 have been canceled. For the following reasons, the prior art rejections are respectfully traversed.

The Applicants respectfully submit that neither the individual nor the combination of the Holland and Rahn references teaches or suggests an optical component forming method including: depositing a lower refractive index layer on the base and a higher refractive index layer on the lower refractive index layer; alternating the lower refractive index layer with the higher refractive index layer for a plurality of layers forming a basis for a stack; depositing a tuning layer having a higher refractive index on the plurality of layers, thus forming the stack; measuring an optical characteristic of the optical component obtained by forming the stack on the base, wherein the measurement step includes measuring a transmittance of the optical component formed from the stack during depositing said tuning layer; controlling, on a basis of the measured optical characteristic of the optical component, a thickness of the

tuning layer by terminating the film formation at the tuning layer when the measured transmittance of the optical component is changed to be decreased; and removing a layer portion formed during a period of time from a time point when the increase/decrease of the measured mean light transmittance of the optical component is stopped to a time point when the measured mean light transmittance is changed to be decreased; and depositing a lower refractive index layer on the tuning layer, thereby forming the multi-layer film., as recited in amended Claim 9.

First, although Holland as stated previously in the Amendment dated August 13, 2002, the Applicants respectfully submit that there is no motivation to combine Rahn with Holland to achieve the claimed features of the present invention. Rather, Holland teaches a precise control of final film thickness by controlling a rate of deposition, where deposition of the film is stopped at a suitable thickness using the optical transmittance of the deposited film.

In contrast, the Rahn reference assumes that the films produced are not manufactured to the correct thickness which cause the structure to be anti-reflective, so milling and chemical etching of the outer film must be conducted in order to correct for errors in outer layer and inner layer thickness (see Rahn, col. 2, lines 20-32).

Accordingly, there is no motivation to combine Rahn with Holland, since with the Holland technique, the need for chemical etching and milling that is taught in Rahn, is obviated.

The Examiner appears to be using Rahn to teach the feature of removing the tuning layer when the measured light transmittance is decreased. However, if there is no motivation to combine Rahn to begin with, then the Applicants respectfully submit that the Examiner is using impermissible hindsight in picking and choosing references which teach various elements of the claims (such as removing the tuning layer) in order to meet the claimed features of the present invention.

Even if the Examiner believes Rahn to be relevant with respect to the removal of the layer portion, Rahn is silent with respect to the removal being conducted during the period when the measured

mean light transmittance is stopped and then decreased. Rahn discloses only that an outer film can be etched to a critical thickness by chemical etching or milling, but does not specify during which time period.

Further, neither Holland nor Rahn teaches or suggests the alternating layers of higher and lower refractive index layers which form the plurality of layers on the base, nor that the tuning layer is one of higher refractive index, and that a layer of lower refractive index is disposed on the tuning layer, forming the multi-layer film.

Rather, Holland is silent with respect to the makeup of the optical layers, and the disposition of a tuning layer. Further, Rahn teaches that the outer layer is the one which has its thickness removed, not a tuning layer which is disposed under a lower refractive layer.

Accordingly, Claim 9 is not obvious over either the individual or the combination of the Holland and Rahn references, and the rejection of Claim 9 under 35 U.S.C. §103 should be withdrawn.

Further, since Claim 17 depends from Claim 9, it is also patentably distinguishable over either the individual or the combination of the Holland and Rahn references for the reasons cited above with respect to Claim 9.

De Vrieze et al. disclose a cathode ray tube having a multi-layer interference filter, the filter having alternate layers with high and low refractive indices.

Nulman discloses a method of monitoring the deposition rate of films during physical vapor deposition, by the measurement of optical attenuation.

The Applicants respectfully submit that neither the individual nor the combination of the Vrieze et al., Holland, Rahn, and Nulman references teaches or suggests a method for forming an optical component including: (i) depositing a plurality of optical layers on a base to form a surface, tje plurality of optical layers comprising alternating layers of lower refractive indices and higher refractive indices, the plurality of layers forming a stack; and (ii) controlling a thickness of one layer of the plurality of optical

layers, by (a) depositing a tuning layer having a higher refractive index on the surface of the plurality of optical layers to form a stack, wherein the tuning layer is the one layer and defines a thickness, (b) measuring an optical characteristic of the stack to obtain a first optical characteristic value, (c) measuring the optical characteristic of the stack after continued deposition of the tuning layer to obtain a second optical characteristic value, (d) determining whether the second optical characteristic value has decreased as compared to the first optical characteristic value, (e) when the second optical characteristic value has not decreased, continuing the depositing of the tuning layer to add to the stack and returning to steps (ii)(b)-(e), and when the second optical characteristic measured has decreased, terminating the depositing of the tuning layer; and (f) adding a layer of a lower refractive index on the tuning layer, thereby forming a multi-layer film, as recited in amended Claim 10.

First, as stated above, there is no motivation to combine Holland with Rahn. Thus, the combination of the Vrieze et al. and Nulman references with Holland and Rahn would not be obvious in meeting the claimed features of the present invention as recited in Claim 10.

Further, none of the applied prior art references teach that one layer - a tuning layer - should be measured for its optical characteristics, such that if the optical characteristic increases/decreases, that the deposition of the tuning layer should be continued/terminated, respectively. Rather, although the control of the deposition rate using optical characteristics is disclosed in the references, using the optical characteristics to achieve a certain thickness of a single layer - the tuning layer - by continuing or terminating deposition, is not disclosed in any reference.

Contrary to the Examiner's assertion that Rahn teaches this feature, the Applicants respectfully submit that Rahn simply discloses that excess thickness or errors in thickness of the outer layer (which is not necessarily the tuning layer of the present invention) are handled by the removal of the excess by chemical etching or milling. This is no way teaches that the thickness of the layer is controlled by the optical characteristics. Further, the Examiner has admitted that Rahn is relevant towards the limitation of

the removal of a layer, which is not relevant in Claim 10.

Further, contrary to the Examiner's assertion that Holland discloses this feature, the Applicants respectfully submit that Holland only discloses terminating deposition at a maximum or minimum reflectance, whereas the present invention does not terminate deposition at a maximum or minimum reflectance, but rather, deposition is continued or terminated based on a thickness of the tuning layer and its optical characteristics.

Further, neither Holland, deVrieze et al., Nulman, nor Rahn teaches or suggests that the tuning layer is one of higher refractive index.

Rather, de Vrieze et al., on whom the Examiner relies, may disclose alternating layers of higher and lower refractive index, but is silent with respect to the tuning layer, and its function within the multi-layer film. The remaining references do not make up for the deficiencies in de Vrieze et al, since Holland is silent with respect to the makeup of the optical layers, and the disposition of a tuning layer, and Rahn only teaches that the outer layer is the one which has its thickness removed, not a tuning layer which is disposed under a lower refractive layer.

Thus, the present invention is patentably distinguishable from the Rahn and Holland references, and the addition of the Vrieze et al. and Nulman references, which are silent with respect to the control of the thickness of the tuning layer and its relation to the optical characteristics of the optical component, and its disposition within the multi-layer film, cannot meet the claimed features of the present invention as recited in Claim 10.

Accordingly, Claim 10 is not obvious over either the individual or the combination of the Vrieze et al., Holland, Rahn, and Nulman references, and the rejection of Claim 10 under 35 U.S.C. §103 should be withdrawn.

With respect to Claim 11, the Applicants respectfully submit that neither the individual nor the combination of the Vrieze et al., Holland, Rahn, and Nulman references, teaches or suggests the step of

removing a layer portion formed during a period of time from a time point when the increase/decrease of the measured mean light transmittance of the optical component is stopped to a time point when the measured mean light transmittance is changed to be decreased.

Rather, as stated above with respect to Claim 9, this feature is not taught or suggested by the applied prior art references.

Accordingly, Claim 11 is not obvious over either the individual or the combination of the Vrieze et al., Holland, Rahn, and Nulman references, and the rejection of Claim 11 under 35 U.S.C. §103 should be withdrawn.

Further, since Claim 11 depends from Claim 10, it is also patentably distinguishable over either the individual or the combination of the Vrieze et al., Holland, Rahn, and Nulman references, for the reasons cited above with respect to Claim 10.

If the Examiner believes that there is any issue which could be resolved by a telephone or personal interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee for such an extension is to be charged to Deposit Account No. 19-3140.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 12-16 were canceled.

The claims were amended as follows:

9. (Twice Amended) An optical component producing method for forming a multi-layer film, [which is composed of alternately stacked layers different in optical characteristic,] on a base, [the method] comprising:

depositing a lower refractive index layer on said base and a higher refractive index layer on said lower refractive index layer;

alternating said lower refractive index layer with said higher refractive index layer for a plurality of layers forming a basis for a stack;

depositing a tuning layer having a higher refractive index on said plurality of layers, thus forming the stack;

measuring an optical characteristic of the optical component obtained by forming the [multi-layer film] stack on the base, wherein the measurement step comprises [the step of]:

measuring a transmittance of the optical component formed from the stack during depositing said tuning layer;

controlling, on a basis of the measured optical characteristic of the optical component, a thickness of [a portion] said tuning layer [of the multi-layer film to be formed on the base] by terminating the film formation at [the portion of the multi-layer film] said tuning layer when the measured transmittance of the optical component is changed to be decreased; and

removing a layer portion formed during a period of time from a time point when the increase/decrease of the measured mean light transmittance of the optical component is stopped to a time point when the measured mean light transmittance is changed to be decreased; and

depositing a lower refractive index layer on said tuning layer, thereby forming the multi-layer film.

10. (Twice Amended) A method for forming an optical component, comprising:

(i) depositing a plurality of optical layers on a base to form a surface, said plurality of optical layers comprising alternating layers of lower refractive indices and higher refractive indices, said plurality of layers forming a stack; and

(ii) controlling a thickness of one layer of said plurality of optical layers, by

(a) depositing a tuning layer having a higher refractive index on the surface of the plurality of optical layers to form a stack, wherein the tuning layer is the one layer and defines a thickness,

(b) measuring an optical characteristic of the stack to obtain a first optical characteristic value,

(c) measuring the optical characteristic of the stack after continued deposition of said tuning layer to obtain a second optical characteristic value,

(d) determining whether the second optical characteristic value has decreased as compared to the first optical characteristic value, [and]

(e) when the second optical characteristic value has not decreased, continuing the depositing of the tuning layer to add to the stack and returning to steps (ii)(b)-(e), and when the second optical characteristic measured has decreased, terminating the depositing of the tuning layer; and

(f) adding a layer of a lower refractive index on the tuning layer, thereby forming a multi-layer film.

11. (Amended) The method of claim 10, wherein if the optical characteristic measured has decreased, the method further comprising:

removing a portion of the tuning layer formed during a period of time, wherein the period of time is defined from a time point when an increase/decrease of the second optical characteristic measured of the stack is stopped to a time point when the second optical characteristic measured is changed to be decreased.

Claim 17 was added.